

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problems Mailbox.**

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>C02F 5/14</b>		<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/21892</b> <b>(43) International Publication Date:</b> 20 April 2000 (20.04.00)
<b>(21) International Application Number:</b> PCT/GB99/03352 <b>(22) International Filing Date:</b> 8 October 1999 (08.10.99) <b>(30) Priority Data:</b> 9822263.1 14 October 1998 (14.10.98) GB 9827177.8 11 December 1998 (11.12.98) GB <b>(71) Applicant (for all designated States except US):</b> ALBRIGHT & WILSON UK LIMITED [GB/GB]; 210-222 Hagley Road, Warley, West Midlands B68 0NN (GB). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> ODELL, Barbara [GB/GB]; 3 Courtfield Drive, Charlton Kings, Cheltenham, Gloucestershire GL52 6XW (GB). JONES, Christopher, Raymond [GB/GB]; 110 Sutherland Road, Cheslyn Hay, Nr. Walsall, West Midlands WS6 7BS (GB). TALBOT, Robert, Eric [GB/GB]; 3 Meriden Close, Cannock, Staffordshire WS11 1QG (GB). <b>(74) Agent:</b> BARKER BRETTELL; 138 Hagley Road, Edgbaston, Birmingham B16 9PW (GB).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>	
<b>(54) Title:</b> LEACHING DIVALENT METAL SALTS  <b>(57) Abstract</b>  A composition for leaching deposits of divalent metal salts such as ferrous sulphide comprises: A) a tetrakis (hydroxymethyl)phosphonium salt; B) an ammonium salt in a ratio of A:B of from 0.01 to 100:1; and C) sufficient of an acid, which is substantially unreactive with tetrakis(hydroxymethyl)phosphonium ion or ammonium ion to maintain the pH below 4.5. The compositions may be solutions or particulate solids.			

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

## LEACHING DIVALENT METAL SALTS

The present invention relates to a system for inhibiting the formation of  
water insoluble divalent metal salt deposits removing or reducing such  
5 deposits or of leaching metal therefrom. The said system includes a  
composition adapted to inhibit or reduce such deposits, a method of  
making said composition and the use of said composition for the aforesaid  
purpose.

10 A number of water insoluble divalent metal salts are associated with  
problems of scaling or blockage, e.g. in the water treatment and oil  
industries. Examples include the carbonates and sulphates of calcium and  
barium. A particular problem in the oil industry is ferrous sulphide  
which forms extensive deposits in oil wells, obstructing the flow through  
15 wells and adjacent strata. Other insoluble divalent metal salts would be  
potentially valuable sources of the metals if they could be solubilised or  
leached economically.

In our copending United Kingdom Patent Application 9819458.2 we have  
20 described novel water soluble complexes of divalent metals with tris  
(hydroxymethyl) phosphine (THP) and ammonia.

These complexes permit insoluble deposits to be solubilised and valuable  
metals to be recovered therefrom. We have devised a composition for use  
25 in solubilising water insoluble divalent metal deposits, which provides  
THP and ammonia. We have, however, discovered that THP reacts with  
ammonia and that the mixture is therefore unstable. We have discovered  
that the corresponding salts, tetrakis (hydroxymethyl) phosphonium salts  
and ammonium salts, do not react together under sufficiently acidic  
30 conditions.

The invention provides a composition comprising: (A) at least 0.01% by weight of a tetrakis (hydroxymethyl) phosphonium salt; (B) an ammonium salt in a ratio of A: B of from 0.01 to 100: 1 (C) sufficient of an acid which is substantially unreactive with tetrakis (hydroxymethyl) phosphonium ion or ammonium ion, to maintain the pH below 4.5; and (D) either sufficient of an aqueous solvent to dissolve the other components or a particulate or porous solid diluent which may consist at least in part of component (C), in an amount sufficient to absorb said components (A) and (B). All references herein to pH, as applied to solid compositions of the invention, are to be construed as referring to the pH of a 1% by weight solution of said composition in water at ambient temperature, or such higher temperature as may be required to obtain a 1% solution, or a hot saturated solution at 100°C or such lower temperature as may be required to obtain a stable solution where the saturation concentration of the composition or its acid component is less than 1% by weight, even at elevated temperature.

The water soluble tetrakis (hydroxymethyl) phosphonium salt (A) may be the sulphate (THPS), the chloride (THPC) or the phosphate. Alternatively the salt may be a salt of any other acid which does not react with the phosphonium ion, such as bromide, phosphite, formate, acetate, trichloracetate, borate or sulphite. However, preferably it is a salt of a strong acid which is not displaced at the pH of the composition. Preferably the concentration of A in the composition is greater than 1% by weight, usually greater than 5% by weight, more usually greater than 10% by weight, typically greater than 20% by weight, more preferably greater than 30% by weight, most preferably greater than 40% by weight, especially greater than 50% by weight, more especially greater than 60% by weight, e.g. 65 to 85% by weight, for instance 70 to 80% by weight.

The ammonium salt (B) may be any water soluble ammonium salt such as ammonium sulphate, ammonium chloride, or an ammonium salt of any of the other acids mentioned above in the context of the tetrakis (hydroxymethyl) phosphonium salt. Thus, the salt (B) may be ammonium  
5 bromide, phosphite, formate, acetate, trichloracetate, borate or sulphite.

The weight ratio of component A to component B is preferably from 0.05 to 50:1, more preferably 0.1 to 30:1, most preferably 0.5 to 20:1, typically 0.6 to 10:1 especially 0.7 to 8:1, more especially 0.8 to 5:1,  
10 e.g. 0.9 to 3:1.

The pH is preferably below 4.3, especially below 4, most preferably below 3.5, typically below 3, e.g. 0.1 to 2.5, for instance 0.5 to 2. The acid (C) may be sulphuric, hydrochloric, phosphoric or any of those  
15 discussed above in connection with the salts, which is sufficiently strong to maintain the required pH. Thus the acid (C) may be hydrobromic acid, phosphorous acid, formic acid, acetic acid, trichloroacetic acid, boric acid or sulphurous acid. Conveniently A, B and D all comprise a common anion.

20

The composition may additionally comprise other water treatment agents which are chemically compatible with A, B and C. For example: scale or corrosion inhibitors, such as 1-hydroxyethane-1,1-diphosphonic acid, amino methylenephosphonic acids, including amino tris  
25 (methylenephosphonate), ethylenediamine tetrakis (methylenephosphonate), diethylenetriamine pentakis (methylenephosphonate), triethylene tetramine hexakis (methylenephosphonate) and higher homologues in the same series; ethanolamine bis (methylenephosphonate), phosphonocarboxylic acids, including phosphonosuccinic acid, and phosphonated telomers of  
30 maleic, fumaric and/or acrylic acid, and copolymers of acrylic, maleic,

vinyl phosphonic, vinyl sulphonic and/or vinyl diphosphonic acids; oxygen scavengers such as hydroxylamine; sequestrants such as sodium tripolyphosphate or potassium pyrophosphate; surfactants, including anionic, non-ionic, cationic and/or amphoteric surfactants; biopenetrants  
5 such as quaternary ammonium polymers and copolymers, water soluble glycolethers and sulphonated aryl formaldehyde copolymers; antifoam such as silicone antifoams and acetylenic glycols; dispersants; flocculants; and/or biocides.

- 10 The composition may be an aqueous solution. According to a particular embodiment the composition may be obtained in solid form by coating the solution upon, or absorbing it into, a particulate or porous solid substrate. In a preferred embodiment a solution of (A) and (B) is coated onto or absorbed into a particulate or porous solid acid which constitutes  
15 components (C) and (D).

The substrate should be chemically inert to component A and preferably acidic in character. Particularly preferred are organic fatty acids, dicarboxylic acids or hydroxy carboxylic acids such as maleic acid,  
20 pimelic acid, suberic acid, azelaic acid, stearic acid, oleic acid, linoleic acid, palmitic acid, succinic acid, glutaric acid, or preferably, adipic acid. We generally prefer substrates with a melting point greater than 60°C, especially greater than 70°C.

- 25 The present invention also provides a method of making the composition hereinabove described. The solid composition may be obtained by spraying the solution, or separate solutions of A and B, onto the substrate, or by mixing the solution or solutions with the substrate and extruding, drying and pulverising the product. It is possible, though  
30 usually less convenient, to prepare separate solids comprising A and B

respectively and mix them. The power may be compacted into granules or tablets, or may be enclosed in water soluble bags or sachets formed from a water-soluble, film-forming polymer, such as polyvinyl alcohol.

- 5 The present invention further provides the use of the composition to reduce the deposit of water-insoluble divalent metal salts in a water system.

- 10 The composition may be added directly to alkaline, neutral or weakly acidic water systems (e.g. at pH down to 5) to dissolve or leach divalent metal, usually in a sufficient dosage to provide 0.1 to 1,000ppm THP in the system, more preferably 0.5 to 500ppm, e.g. 1 to 400ppm, especially 5 to 300ppm, more especially 10 to 200ppm, most especially 20 to 100ppm. It may be convenient, at least partially, to neutralise the acid  
15 composition prior to addition to neutral or acidic water systems.

The invention is illustrated by the following examples.

#### Example 1

20

An aqueous solution of 50% by weight THPS and 25% by weight ammonium sulphate was adjusted to pH1 with sulphuric acid. The composition was stable on storing.

- 25 The solution was dosed to an alkaline formation water in an oil well obstructed with ferrous sulphide deposits at a rate equivalent to 100ppm THPS. The ferrous sulphide dissolved as a bright red complex.

*oil well*



**Example 2**

A solution of 50% by weight THPS and 25% by weight ammonium sulphate was sprayed as a fine mist onto an air fluidised bed of powdered adipic acid at 40°C. The product was a free flowing powder containing  
5 11% by weight THPS, 6 % by weight ammonium sulphate and 3% moisture. The product was stable on storage.

## CLAIMS

1. A composition comprising:
  - 5 (A) at least 0.01% by weight of a tetrakis(hydroxymethyl)phosphonium salt;
  - (B) an ammonium salt in an amount such that the ratio of (A) to (B) is from 0.01:1 to 100:1;
  - 10 (C) a sufficient amount of an acid which is substantially unreactive with tetrakis(hydroxymethyl)phosphonium ions and with ammonium ions to maintain the pH of the composition below 4.5;
  - 15 (D) either: sufficient of an aqueous solvent to dissolve said components (A), (B) and (C)
  - or: a particulate or porous solid diluent, in an amount sufficient to absorb said components (A) and (B).
  - 20
2. A composition according to Claim 1, wherein said solid diluent consists, at least in part of said component (C).
3. A composition according to Claim 1 or 2, wherein said component
- 25 (A) consists essentially of tetrakis(hydroxymethyl)phosphonium sulphate, chloride or phosphate.
4. A composition according to Claim 1 or 2, wherein said component (A) consists essentially of tetrakis(hydroxymethyl)phosphonium bromide,
- 30 phosphite, formate, acetate, tri-chloroacetate, borate or sulphite.

5. A composition according to any one of the preceding claims,  
wherein the concentration of said component (A) ranges from greater than  
1% by weight to greater than 60% by weight.
- 5 6. A composition according to Claim 5, wherein the concentration of  
said component (A) is in the range 65% to 85% by weight, for example  
70% to 80% by weight.
7. A composition according to any one of the preceding claims,  
10 wherein said component (B) consists essentially of ammonium sulphate or  
ammonium chloride.
8. A composition according to any one of Claims 1 to 6, wherein said  
component (B) consists essentially of ammonium bromide, phosphite,  
15 formate, acetate, tri-chloracetate, borate or sulphite.
9. A composition according to any one of the preceding claims,  
wherein the weight ratio of said component (A) to said component (B) is  
in the range 0.05:1 to 50:1, preferably 0.1:1 to 30:1, more preferably  
20 0.5:1 to 20:1.
10. A composition according to Claim 9, wherein said ratio is in the  
range 0.6:1 to 10:1, preferably 0.7:1 to 8:1, more preferably 0.8:1 to  
5:1, for example 0.9:1 to 3:1.
- 25 11. A composition according to any one of the preceding claims,  
wherein said component (C) consists essentially of sulphuric acid,  
hydrochloric or phosphoric acid.

12. A composition according to any one of Claims 1 to 10, wherein said component (C) consists essentially of hydrobromic acid, phosphorous acid, formic acid, acetic acid, tri-chloroacetic acid, boric acid or sulphurous acid.

5

13. A composition according to any one of the preceding claims, wherein the pH of the composition is below 4.3, preferably below 4, for example below 3.5 and most preferably below 3.

10 14. A composition according to Claim 13, wherein the pH is in the range 0.1 to 2.5, for example 0.5 to 2.

15 15. A composition according to any one of Claims 1 to 14, wherein said component (D) comprises an aqueous solvent capable of dissolving said components (A), (B) and (C).

16. A composition according to any one of Claims 1 to 14, wherein said component (D) comprises a particulate or porous substrate which constitutes said components (C) and (D) of said composition.

20

17. A composition according to Claim 16, wherein said substrate is chemically inert to said component (A).

18. A composition according to Claim 16 or 17, wherein said substrate  
25 is acidic in character.

19. A composition according to Claim 16, 17 or 18, wherein said substrate consists essentially of one or more organic mono-carboxylic, di-carboxylic or hydroxy-carboxylic acids.

30

20. A composition according to Claim 19, wherein said acid is selected from the group consisting of maleic acid, pimelic acid, suberic acid, azelaic acid, stearic acid, oleic acid, linoleic acid, palmitic acid, succinic acid, glutaric acid and adipic acid.

5

21. A composition according to any one of Claims 17 to 20, wherein said substrate has a melting point greater than 60°C, for example greater than 70°C.

10 22. A composition according to any one of the preceding claims, wherein said composition additionally contains one or more of the following water-treatment agents:

- (i) scale inhibitors
- 15 (ii) corrosion inhibitors
- (iii) oxygen scavengers
- (iv) sequestrants
- (v) surfactants
- (vi) bio-penetrants
- 20 (vii) antifoams
- (viii) dispersants
- (ix) flocculants
- (x) biocides

25 23. A method of making a composition according to any one of Claims 16 to 22, wherein said method comprises spraying a solution (or separate solutions) of said components (A) and (B) on to the substrate.

24. A method of making a composition according to any one of  
30 Claims 16 to 22, wherein said method comprises mixing solutions of said

components (A) and (B) with the substrate and extruding, drying and pulverising the product.

25. The use of a composition according to any one of Claims 1 to 22 to  
5 reduce the deposits of water-insoluble divalent metal salts in a water system.

26. Use according to Claim 25, wherein the composition is dosed into  
the water system to provide a concentration of THP ion in the range 0.1  
10 to 1000 parts per million (ppm).

27. Use according to Claim 26, wherein said concentration is in the  
range 0.5 to 500ppm, preferably 1 to 400 ppm, for example 5 to 300 ppm.

15 28. Use according to Claim 26 or 27, wherein said concentration is in  
the range 10 to 200 ppm, for example 20 to 100ppm.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/03352

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C02F5/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 251 032 A (HOOKER CHEMICAL) 27 October 1971 (1971-10-27) page 1, line 19,20; claims 1-18 ---	1,3,4,25
X	GB 2 271 787 A (ALBRIGHT & WILSON) 27 April 1994 (1994-04-27) claims 1-19 ---	1,12,15
X	EP 0 709 518 A (ALBRIGHT & WILSON) 1 May 1996 (1996-05-01) page 3, line 2,6; claims 1-19 ---	1
A	GB 2 145 708 A (ALBRIGHT & WILSON) 3 April 1985 (1985-04-03) claims 1-19 ---	
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

19 January 2000

Date of mailing of the international search report

27/01/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Fouquier, J-P

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 99/03352

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 257 043 A (ALBRIGHT & WILSON) 6 January 1993 (1993-01-06) claims 1-5 ---	
A	GB 1 065 547 A (HOOKER CHEMICAL) claims 1-20 -----	



# INTERNATIONAL SEARCH REPORT

information on patent family members

Inte: nal Application No

PCT/GB 99/03352

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 1251032 A	27-10-1971	BE 723244 A	30-04-1969
		DE 1817812 A	02-03-1972
		DE 1806886 A	05-02-1970
		FR 1590292 A	13-04-1970
		GB 1251031 A	27-10-1971
		NL 6815634 A,B,	06-05-1969
		US 3578708 A	11-05-1971
		US 3717701 A	20-02-1973
		JP 49033748 B	09-09-1974
		US 3661953 A	09-05-1972
		US 3661960 A	09-05-1972
		US 3677956 A	18-07-1972
GB 2271787 A	27-04-1994	AT 139586 T	15-07-1996
		AU 658334 B	06-04-1995
		AU 4913093 A	05-05-1994
		BR 9304296 A	30-04-1996
		CA 2108857 A	23-04-1994
		CN 1090612 A,B	10-08-1994
		CZ 9302247 A	18-05-1994
		DE 69303251 D	25-07-1996
		DE 69303251 T	12-12-1996
		DK 595142 T	15-07-1996
		EP 0595142 A	04-05-1994
		ES 2090814 T	16-10-1996
		FI 934649 A	23-04-1994
		GR 3020545 T	31-10-1996
		HU 67957 A,B	29-05-1995
		IL 107305 A	18-02-1997
		JP 7003648 A	06-01-1995
		NO 933760 A	25-04-1994
		NZ 248978 A	26-10-1994
		PL 300801 A	16-05-1994
		TR 27188 A	30-11-1994
		US 5378243 A	03-01-1995
		ZA 9307711 A	16-06-1994
EP 709518 A	01-05-1996	AU 686451 B	05-02-1998
		AU 3440195 A	09-05-1996
		BR 9504524 A	27-05-1997
		CA 2161273 A	26-04-1996
		CN 1145428 A	19-03-1997
		CZ 9502796 A	15-05-1996
		FI 955077 A	26-04-1996
		GB 2294479 A,B	01-05-1996
		HU 73050 A	28-06-1996
		JP 8209534 A	13-08-1996
		NO 954248 A	26-04-1996
		NZ 280244 A	26-11-1996
		PL 311115 A	29-04-1996
		US 5688429 A	18-11-1997
		ZA 9508797 A	21-05-1996
GB 2145708 A	03-04-1985	AT 32330 T	15-02-1988
		AU 563765 B	23-07-1987
		AU 3247384 A	28-02-1985
		CA 1245126 A	22-11-1988
		DE 3469162 A	10-03-1988

# INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/GB 99/03352

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2145708 A		EP 0139404 A	02-05-1985
		FI 843357 A,B,	27-02-1985
		JP 1841615 C	12-05-1994
		JP 60072807 A	24-04-1985
		NO 843399 A,B,	27-02-1985
		US 4673509 A	16-06-1987
		ZA 8406638 A	27-11-1985
GB 2257043 A	06-01-1993	NONE	
GB 1065547 A		BE 675066 A	03-05-1966
		DE 1285442 B	
		FR 85909 E	02-02-1966
		NL 6404149 A	25-03-1965
		US 3310419 A	21-03-1967